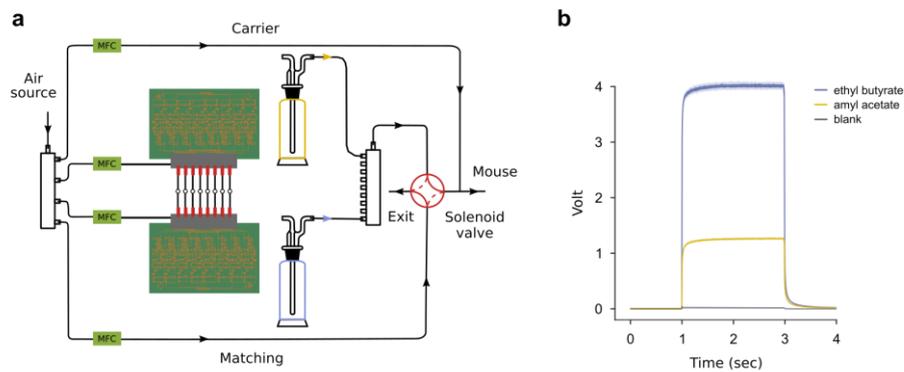
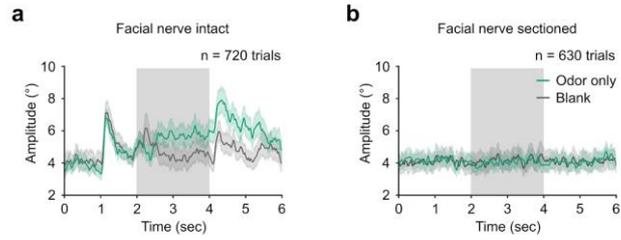


Supplementary Materials

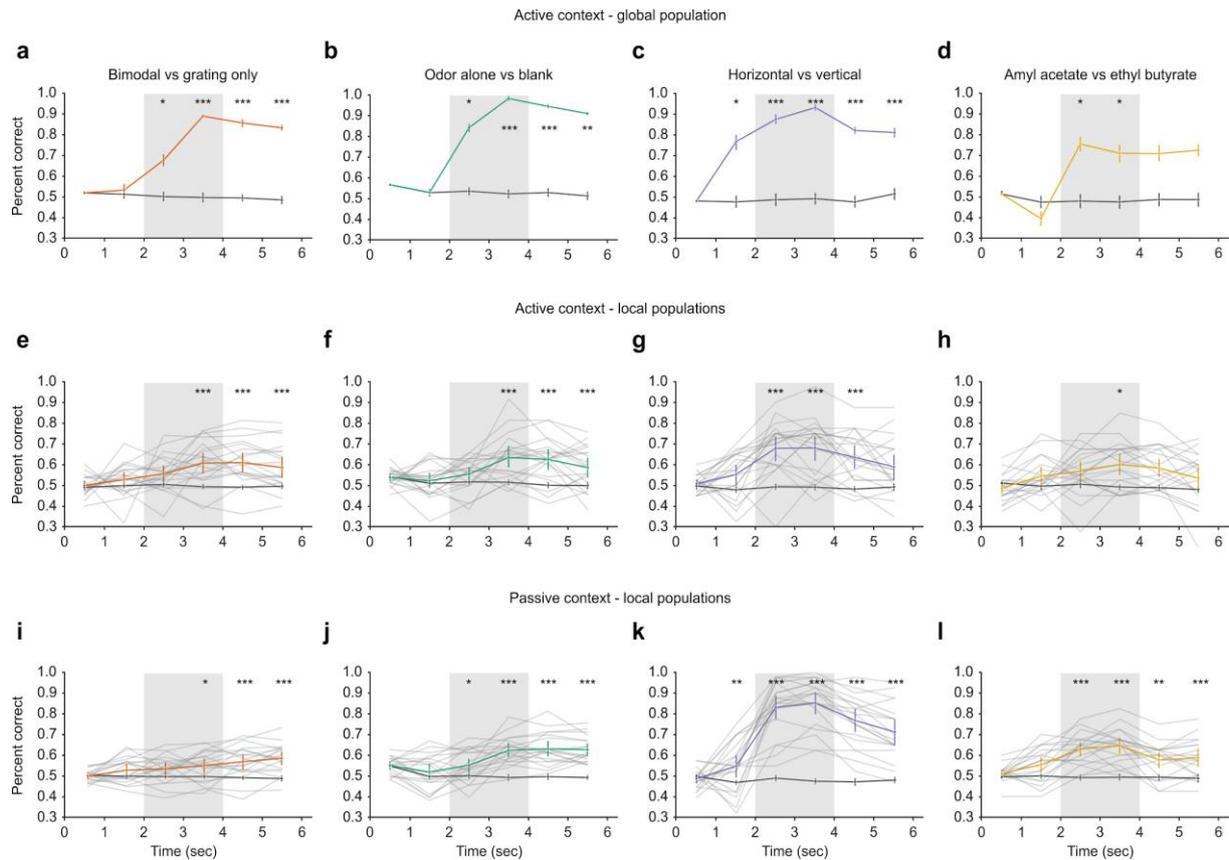
Renard et al., Olfactory modulation of barrel cortex activity during active whisking and passive whisker stimulation



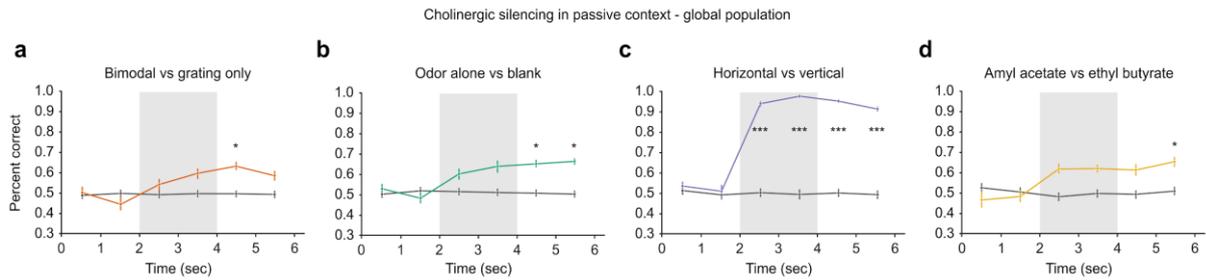
Supplementary figure 1. Design and calibration of the custom-built olfactometer. **a** The olfactometer was constructed with chemically inert 1/16" and 1/32" inner diameter polytetrafluoroethylene tubing. The flow rates of four independent streams were regulated by mass flow controllers (MFC; SFC5400, Sensirion). Two MFC's (250 ml/min each) controlled the flow producing odorized air by passing through 20 ml of odor solutions prediluted at 0.1% in mineral oil and contained in small bottles (Wilmad ML-1490-702, SP Scienceware). Two MFC's controlled the carrier and matching streams (500 ml/min each). The carrier stream was constantly delivering 500 ml/min to the mouse. A shuttle valve was used to switch between matching and odorized streams with precise timing. The output flow to the animal was constant at 1 L/min. Valves to an empty bottle were actuated during trials without odors. **b** Photoionization detector (PID) measurements showing temporal precision of odor presentation. The PID was placed at the location of the mouse's snout. Shading indicates standard deviation over n = 10 trials.



Supplementary figure 2. Whisking is abolished by bilateral section of the facial nerve. a Average whisking amplitude within sessions for trials without tactile gratings for mice with intact facial nerves (active context). Shading indicates 95% CI; n = 720 trial from 18 sessions and 10 mice. **b** Analogous to *a* for mice with sectioned facial nerves (passive context); n = 630 trials from 9 sessions and 5 mice (some sessions from the passive context were not included as videos of the whiskers were not recorded for all sessions in this context). The baseline of 4° in amplitude is the result of an imprecision of whisker detection from frame to frame.



Supplementary figure 3. Olfactory information is also present in the active context in S1 and between populations in both contexts. **a-d** Accuracy of centroid classifier decoding of stimulus from S1 activity in the active context averaged over 1 sec time bins; analogous to **Fig. 6 a-d**. Performance for shuffled labels is shown in gray. P-values were obtained as the location of the mean accuracy in a distribution of 1000 shuffles; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Error bars indicate 95% CI with $n = 10$ for real data and $n = 100$ for shuffled data; each data point is the average of a 20-fold stratified cross-validation; shading indicates stimulus presentation. **e-h** Analogous to **a-d** with decoding performance across sessions in the active context. Each data point is the average of a 20-fold stratified cross-validation with data from single sessions. Significance was assessed by comparing the mean accuracy of real and shuffled data with $n = 20$ and $n = 19$ sessions in the active and passive contexts, respectively (Wilcoxon signed-rank test). Grey lines indicate single session performance. **i-l** Analogous to **e-h** in the passive context. Note that the data was z-scored to reach significant performance in the results presented in this figure, which was not the case in **Fig. 6**.



Supplementary figure 4. Olfactory information is present during silencing of cholinergic input to S1. a-d Accuracy of centroid classifier decoding of stimulus during silencing of cholinergic inputs from S1 activity in the passive context averaged over 1 sec time bins; analogous to **Fig. 6 a-d**. Performance for shuffled labels is shown in gray. P-values were obtained as the location of the mean accuracy in a distribution of 1000 shuffles; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Error bars indicate 95% CI with $n = 10$ for real data and $n = 100$ for shuffled data; each data point is the average of a 20-fold stratified cross-validation; shading indicates stimulus presentation. The data was z-scored similarly to **Supplementary Fig. 3**

Within sessions			
	Condition	Mean (95% CI)	p-value
Amplitude	Bimodal	4.67 (4.37, 4.99)	0.081
	Grating only	4.31 (4.01, 4.63)	
	Odor only	6.01 (5.60, 6.43)	1.10 ⁻⁶
	Blank	5.08 (4.62, 5.59)	
Setpoint	Bimodal	82.51 (81.81, 83.19)	0.12
	Grating only	81.91 (81.20, 82.62)	
	Odor only	86.50 (85.71, 87.30)	0.014
	Blank	85.25 (84.34, 86.17)	
Curvature change	Bimodal	0.053 (0.048, 0.058)	0.04
	Grating only	0.048 (0.043, 0.052)	
	Odor only	0.030 (0.028, 0.032)	0.001
	Blank	0.024 (0.023, 0.026)	
Between sessions			
Amplitude	Bimodal	4.65° (3.83, 5.49)	0.042
	Grating only	4.27° (3.62, 5.00)	
	Odor only	6.01° (5.6, 6.43)	1x10 ⁻⁴
	Blank	5.08° (4.62, 5.59)	
Setpoint	Bimodal	82.79 (79.17, 86.50)	0.111
	Grating only	82.18 (78.73, 85.89)	
	Odor only	86.64 (82.53, 91.27)	0.002
	Blank	85.44 (81.35, 89.82)	
Curvature change	Bimodal	0.053 (0.039, 0.069)	0.017
	Grating only	0.047 (0.036, 0.061)	
	Odor only	0.030 (0.022, 0.038)	0.001
	Blank	0.025 (0.019, 0.031)	

Supplementary table 1. Mean (95% CI) of average whisking amplitude, setpoint, absolute curvature change, both within and between sessions, presented in **Fig. 3**. Averages are computed over the 2 sec stimulus presentation epoch. P-values are from the statistical tests comparing bimodal versus grating only conditions and odor only versus blank (Mann-Whitney U test within sessions and Wilcoxon signed-rank test between sessions).

Within sessions			
	Condition	Mean (95% CI)	p-value
Amplitude	Bimodal	0.23 (0.21, 0.25)	1.10 ⁻⁵
	Grating only	0.30 (0.27, 0.34)	
	Odor only	0.23 (0.21, 0.26)	1.10 ⁻⁴
	Blank	0.30 (0.27, 0.34)	
Frequency	Bimodal	2.78 (2.71, 2.85)	0.002
	Grating only	2.89 (2.83, 2.96)	
	Odor only	2.79 (2.71, 2.86)	0.008
	Blank	2.85 (2.79, 2.92)	
Between sessions			
Amplitude	Bimodal	0.23 (0.12, 0.37)	0.002
	Grating only	0.30 (0.15, 0.52)	
	Odor only	0.23 (0.12, 0.38)	0.003
	Blank	0.30 (0.15, 0.51)	
Frequency	Bimodal	2.76 (2.58, 2.92)	0.068
	Grating only	2.89 (2.72, 3.05)	
	Odor only	2.77 (2.59, 2.93)	0.355
	Blank	2.84 (2.68, 3.00)	

Supplementary table 2. Mean (95% CI) of average breathing amplitude and frequency, both within and between sessions, presented in **Fig. 3**. Averages are computed over the 2 sec stimulus presentation epoch. P-values are from the statistical tests comparing bimodal versus grating only conditions and odor only versus blank (Mann-Whitney U test within sessions and Wilcoxon signed-rank test between sessions).